WE CLAIM:

1. A linear motor comprising:

a magnet track;

a magnet assembly coupled to the magnet track, the magnet assembly having a plurality of side-by-side alternating magnetic north poles and magnetic south poles; and

an armature having a plurality of side-by-side electrically conductive coils formed on an electrically and magnetically nonconductive substrate which is movably coupled to the magnet track such that the side-by-side electrically conductive coils are positioned and movable in spaced parallel relation to the side-by-side alternating magnetic poles, the substrate including a plurality of electrically nonconductive layers laminated together, each layer having a plurality of electrically conductive windings formed thereon in side-by-side relation on at least one surface thereof with adjacent conductive windings of each layer electrically isolated from each other on the layer, each electrically conductive winding of each layer positioned in registration and electrically connected with a corresponding electrically conductive winding on each other layer to form one of the electrically conductive coils.

2. The linear motor as set forth in claim 1, wherein for each coil, the electrically conductive windings on adjacent layers are configured so that magnetic fields produced thereby in response to an electric current flowing through each electrically conductive winding are additive.

3. The linear motor as set forth in claim 2, wherein:

the electrically conductive windings of adjacent layers forming one of the electrically conductive coils are electrically connected in series (i) on or adjacent the centers of the electrically conductive windings or (ii) adjacent the perimeters of the electrically conductive windings; and

the electrical current flows around the central axis of one of the electrically conductive windings of adjacent layers from a perimeter thereof toward the central axis and flows around the central axis of the other of the electrically conductive windings of adjacent layers from on or adjacent the central axis toward the perimeter thereof.

4. The linear motor as set forth in claim 1, wherein:

each layer includes a plurality of heat transfer vias therethrough; and

the plurality heat transfer vias of each layer is positioned in registration with the corresponding plurality of heat transfer vias in the other layers.

5. The linear motor as set forth in claim 1, wherein the windings of each coil positioned in registration are electrically connected via a conductor received in at least one hole and/or via formed in each layer.

6. The linear motor as set forth in claim 5, wherein:

each layer includes a plurality of heat transfer vias therethrough; and

the plurality of heat transfer vias of each layer is aligned coaxially with the corresponding plurality of heat transfer vias in the other layer.

7. The linear motor as set forth in claim 1, further including a plurality of spacers positioned between two or more adjacent layer for maintaining the two or more adjacent layers in spaced parallel relation with a gap therebetween.

8. The linear motor as set forth in claim 1, wherein:

each layer is rigid or flexible; and

the magnet assembly includes at least one magnet coupled to the magnet track.

9. The linear motor as set forth in claim 1, wherein the plurality of side-by-side electrically conductive coils includes an integer multiple of N coils, with every Nth coil electrically connected together.

10. The linear motor as set forth in claim 9, wherein selectively energizing adjacent conductive coils with different phases of an N phase electrical source causes the armature to move relative to the magnet assembly.

11. A linear motor comprising a linear armature having a plurality of layers, each layer having a plurality of electrically conductive windings formed thereon in side-by-side relation on one surface thereof, the plurality of layers laminated together with the plurality of electrically conductive windings of each layer positioned in registration, wherein each electrically

conductive winding on each layer is electrically connected with corresponding electrically conductive windings positioned in registration therewith on the other layers and adjacent electrically conductive windings on each layer are electrically isolated from each other on the layer.

12. The linear motor as set forth in claim 11, wherein electrically conductive windings in registration on adjacent layers are configured to produce magnetic fields that are additive in response to each of the electrically conductive windings in registration receiving an electric current therethrough.

13. The linear motor as set forth in claim 12, wherein:

the electrically conductive windings in registration on adjacent layers have a common central axis; and

around the central axis of each pair of electrically conductive windings in registration on adjacent layers, electric current flows in one of the pair of electrically conductive windings from a perimeter to the central axis thereof and electrical current flows in the other of the pair of electrically conductive windings from the central axis toward a perimeter thereof.

14. The linear motor as set forth in claim 12, wherein two or more electrically conductive windings of each layer are electrically connected.

15. The linear motor as set forth in claim 11, wherein:

each layer includes a plurality of heat transfer vias therethrough; and

the plurality of heat transfer vias of each layer is aligned coaxially with the corresponding plurality of heat transfer vias in registration therewith in the other layers.

16. The linear motor as set forth in claim 11, further including a plurality of spacers positioned between two or more adjacent layers for maintaining the two or more adjacent layers in spaced parallel relation with a gap therebetween.

17. The linear motor as set forth in claim 11, wherein each layer is formed from flexible or rigid material.

18. A motor comprising an armature having a plurality of side-by-side electrically conductive coils formed on an electrically and magnetically nonconductive substrate with adjacent coils electrically isolated from each other, each coil including a plurality of electrically conductive windings positioned coaxially and electrically connected so that in response to an electrical current flowing therethrough each winding produces a magnetic field having the same polarity.

19. The motor as set forth in claim 18, wherein adjacent windings of each coil have opposite winding directions.

20. The motor as set forth in claim 18, wherein the windings of each coil are connected in series.